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APPLICATION FOR UNITED STATES PATENT

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CAM ASSISTED WHEEL BRAKE

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CROSS-REFERENCE TO RELATED APPLICATION

35 This application claims the benefit to provisional application No. 60/417,027, filed on  
October 7, 2002, entitled CAM ASSISTED WHEEL BRAKE, the disclosure of which is  
incorporated by reference in its entirety herein.

FIELD OF THE INVENTION

This present invention relates to brakes for road bicycles and other wheeled vehicles.

## BACKGROUND OF THE INVENTION

There are a number of bicycle brakes of various designs on the market, most of which are either scissor type brakes (Fig. 1) or dual pivot (Fig. 2). There are advantages to both designs. The idea is to build in enough leverage to develop the necessary power to stop the bicycle while at the same time keeping the size and weight of the brake to a minimum. In each of these designs, the brakes draw two opposing pads onto each side of the rim of the bike wheel. The brake squeezes the rim of the wheel between the two pads using a cable, two arms which hold the pads, and a lever at the handle bar. The advantage of the scissor brake is that it can usually be made lighter than the dual pivot due to a reduced number of parts. However, the scissor brakes usually do not have as much power as the dual pivot style. The dual pivot design increases power by lengthening one of the arms through the use of a secondary pivot, which is off center of the normal pivot. These brakes are also cast or forged aluminum which does not bend much before breaking, therefore if the brake does fail, the failure is catastrophic and all function is lost. This fact forces manufacturers to build the brakes a bit bigger to avoid liability issues.

## BRIEF DESCRIPTION OF THE DRAWINGS

The invention is illustrated in the drawings in which like reference characters designate the same or similar parts throughout the figures of which:

Fig. 1 is a schematic view of a prior art brake of the scissor type;

Fig. 2 is a schematic view of a prior art brake of the dual pivot type;

Fig. 3 is a schematic view of one exemplary embodiment of the present invention from the back in the open position;

Fig. 4 is a schematic view of the embodiment of Fig. 3 from the front in the open position;

5 Fig. 5 is a schematic view of the embodiment of Fig. 3 from the back in the closed position;

Fig. 6 is a schematic view of the embodiment of Fig. 3 from the front in the closed position;

Fig. 7 is a perspective view of the embodiment of Fig. 3; and

10 Fig. 8 is a different perspective view of the embodiment of Fig. 3.

#### DETAILED DESCRIPTION OF THE EMBODIMENTS

The present invention is an improvement of the previously existing scissor brake. It utilizes a lever cam to increase the force applied to the arms. It also provides a novel, simple method of quick release to open the brake a little wider in the event the rim is  
15 damaged; this keeps the pads from rubbing on the rim in the open position. And, the present invention provides a plastic spring for opening the brake (which provides a lighter solution than a steel spring).

The heart of the invention lies in the lever cam mechanism (shown in the open position in Figs. 3-4 and in the closed position in Figs. 5-6), which increases the force to the arms  
20 thereby enabling the arms to be shorter than what would be required with direct

application of the same force to generate the same squeezing power on the rim. And the cam mechanism for lowering the cam lever for quick release. And the use of a plastic spring.

5 The major advantage to this method of applying a squeezing force on the rim is that the arms of the brake can be much smaller above the pivot point than any existing brake. This decreases the size and weight of the brake. Another advantage is the arms are machined from 7075 aluminum which is roughly twice as strong as most cast aluminum alloys and offers the benefit of bending rather than breaking when being over-stressed. This allows the parts to be made smaller and lighter. The cam quick release is a novel  
10 approach to opening the brake further and the plastic spring offers a lighter weight approach to steel springs for opening the brake.

These ideas may have been over looked due to the perception that a direct application of force would be a more efficient approach and that machining parts is costlier than casting or forging. Also, that in the past, machined components have not received the level of  
15 desire by the consumer that they enjoy today as more and more road bike enthusiasts seek to push the envelope of the lightest equipment possible.

The present invention works as follows (see Figs. 7-8 for a perspective view). The device comprises two arms mounted on a screw, which provides a pivot point for the arms and a means for attachment of the brake to the fork of the bicycle. It consists of a novel cam  
20 lever, which is operated by the bike's existing brake cable and is attached via the cam release to one arm. The arm with the cam lever also has provision for the bike's cable housing adjuster. The brake has a plastic spring, which provides an opposing force to the

- cable and opens the brake. When the existing lever on the handle bar is pulled, the existing cable is drawn into the housing, which is attached to one arm. The end of the cable being attached to the free end of the cam lever, which pulls the cam lever up toward the cable adjuster. The lobe of the cam lever makes contact with the bearing section of
- 5 the second arm. This causes the arms to move in a way that draws the brake pads toward each other and squeezes the rim of the bicycle. When the lever on the handle bar is released, the plastic spring forces the arms back to the open position. The tab of the quick release may be moved upward to drop the fulcrum of the cam lever. This drops the lobe and allows the brake to open up further.
- 10 Off-the-shelf components that may be used with the brake are pads and pad holders, cable adjuster, the center bolt, a washer and setscrew.

Although only a few exemplary embodiments of this invention have been described in detail above, those skilled in the art will readily appreciate that many modifications are possible in the exemplary embodiments without materially departing from the novel

15 teachings and advantages of this invention. Accordingly, all such modifications are intended to be included within the scope of this invention as defined in the following claims.